AMENDMENTS TO THE CLAIMS

This listing of claims replaces all previous versions and listings of claims in this application.

Claim Listing:

1. (Currently amended) An electro-optical switch, comprising:

a non-piezoelectric photonic crystal having first and second waveguides ~~provided~~ each arranged in a plane therein and each having a respective input portion and a respective output portion, the respective input portions being unconnected to each other, wherein the first waveguide is adjacent to the second waveguide along a coupling length in the plane, and a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides.

2. (Original) An electro-optical switch as recited in claim 1, wherein said photonic crystal comprises a periodic array of silicon pillars arranged in a square lattice.

3. (Original) An electro-optical switch as recited in claim 1, wherein said photonic crystal comprises a periodic array of air holes arranged in a hexagonal lattice.

4. (Original) An electro-optical switch as recited in claim 1, wherein the propagation constants of the first and second waveguides are equivalent.

5. (Original) An electro-optical switch as recited in claim 4, wherein the first and second waveguides electro-optically couple to each other at all optical wavelengths.

6. (Original) An electro-optical switch as recited in claim 1, wherein the first and second waveguides are identical.

7. (Original) An electro-optical switch as recited in claim 6, wherein the first and

second waveguides electro-optically couple to each other at all optical wavelengths.

8. (Currently amended) A photonic bandgap integrated circuit, comprising:

a non-piezoelectric photonic crystal; and

an electro-optical switch formed by providing first and second waveguides in said photonic crystal adjacent each other ~~along~~ in a plane containing a coupling length, wherein a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides,

wherein the first and second waveguides each have a respective input portion and a respective output portion, the respective input portions being unconnected to each other.

9. (Original) A photonic bandgap integrated circuit as recited in claim 8, wherein said photonic crystal comprises a periodic array of silicon pillars arranged in a square lattice.

10. (Original) A photonic bandgap integrated circuit as recited in claim 8, wherein said photonic crystal comprises a periodic array of air holes arranged in a hexagonal lattice.

11. (Original) A photonic bandgap integrated circuit as recited in claim 8, wherein the propagation constants of the first and second waveguides are equivalent.

12. (Original) A photonic bandgap integrated circuit as recited in claim 11, wherein the first and second waveguides electro-optically couple to each other at all optical wavelengths.

13. (Original) A photonic bandgap integrated circuit as recited in claim 8, wherein the first and second waveguides are identical.

14. (Original) A photonic bandgap integrated circuit as recited in claim 13, wherein the first and second waveguides electro-optically couple to each other at all optical wavelengths.

15. (Currently amended) A coupled photonic crystal waveguided system,

comprising:

first and second photonic bandgap waveguides provided adjacent to each other ~~along~~ in a plane containing a non-piezoelectric coupling length, wherein a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between said first and second photonic bandgap waveguides,

wherein the first and second waveguides each have a respective input portion and a respective output portion, the respective input portions being unconnected to each other.

16. (Original) A coupled photonic crystal waveguided system as recited in claim 15, wherein the photonic crystal comprises a periodic array of silicon pillars arranged in a square lattice.

17. (Original) A coupled photonic crystal waveguided system as recited in claim 15, wherein the photonic crystal comprises a periodic array of air holes arranged in a hexagonal lattice.

18. (Original) A coupled photonic crystal waveguided system as recited in claim 15, wherein the propagation constants of said first and second photonic bandgap waveguides are equivalent.

19. (Original) A coupled photonic crystal waveguided system as recited in claim 18, wherein said first and second photonic bandgap waveguides electro-optically couple to each other at all optical wavelengths.

20. (Original) A coupled photonic crystal waveguided system as recited in claim 15, wherein said first and second photonic bandgap waveguides are identical.

21. (Original) A coupled photonic crystal waveguided system as recited in claim 20, wherein said first and second photonic bandgap waveguides electro-optically couple to each other at all optical wavelengths.

22. (Currently amended) A method for providing an electro-optical switch, comprising:

providing a non-piezoelectric photonic crystal;

providing first and second waveguides in the photonic crystal adjacent to each other in a plane along a coupling length; and

changing a conductance in the plane along the coupling length to provide electro-optical switching between the first and second waveguides,

wherein said changing a conductance is accomplished by an electro-optic effect within the coupling length, wherein the first and second waveguides each have a respective input portion and a respective output portion, the respective input portions being unconnected to each other.

23. (Original) A method for providing an electro-optical switch as recited in claim 22, wherein the photonic crystal comprises a periodic array of silicon pillars arranged in a square lattice.

24. (Original) A method for providing an electro-optical switch as recited in claim 22, wherein the photonic crystal comprises a periodic array of air holes arranged in a hexagonal lattice.

25. (Original) A method for providing an electro-optical switch as recited in claim 22, wherein the propagation constants of the first and second waveguides are equivalent.

26. (Original) A method for providing an electro-optical switch as recited in claim 25, wherein the first and second waveguides electro-optically couple to each other at all optical wavelengths.

27. (Original) A method for providing an electro-optical switch as recited in claim 22, wherein the first and second waveguides are identical.

28. (Original) A method for providing an electro-optical switch as recited in claim 27, wherein the first and second waveguides electro-optically couple to each other at all optical wavelengths.

29. (Currently amended) The electro-optical switch of claim 1, wherein the change in conductance along the coupling length is induced by electrical carrier injection provided by a forward-biased PN junction.

30. (Currently amended) ~~The electro-optical switch of claim 1,~~ An electro-optical switch, comprising:

a non-piezoelectric photonic crystal having first and second waveguides provided each arranged in a plane therein, wherein the first waveguide is adjacent to the second waveguide along a coupling length in the plane, and a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguide,

wherein the change in conductance along the coupling length is optically induced by electron-hole pair generation.

31. (Previously presented) The electro-optical switch of claim 1, further comprising electrical or optical means for modulating a coupling coefficient between the first and second waveguides.

32. (Currently amended) The photonic bandgap integrated circuit of claim 8, wherein the change in conductance along the coupling length is induced by electrical carrier injection provided by a forward-biased PN junction.

33. (Currently amended) ~~The photonic bandgap integrated circuit of claim 8~~ A photonic bandgap integrated circuit, comprising:

a non-piezoelectric photonic crystal; and

an electro-optical switch formed by providing first and second waveguides in said

photonic crystal adjacent each other along in a plane containing a coupling length, wherein a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides,

wherein the change in conductance along the coupling length is optically induced by electron-hole pair generation.

34. (Previously presented) The photonic bandgap integrated circuit of claim 8, further comprising electrical or optical means for modulating a coupling coefficient between the first and second waveguides.

35. (Currently amended) The coupled photonic crystal waveguided system of claim 15, wherein the change in conductance along the coupling length is induced by electrical carrier injection provided by a forward-biased PN junction.

36. (Currently amended) ~~The coupled photonic crystal waveguided system of claim 15~~ A coupled photonic crystal waveguided system, comprising:

first and second photonic bandgap waveguides provided adjacent to each other along in a plane containing a non-piezoelectric coupling length, wherein a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between said first and second photonic bandgap waveguides,

wherein the change in conductance along the coupling length is induced optically by electron-hole pair generation.

37. (Previously presented) The coupled photonic crystal waveguided system of claim 15, further comprising an electrical or optical means for modulating a coupling coefficient along the coupling length.

38. (Currently amended) The method for providing an electro-optical switch of claim

22, wherein said changing the conductance along the coupling length comprises injecting electrical carriers provided by a forward-biased PN junction.

39. (Currently amended) ~~The method for providing an electro-optical switch of claim 22~~ A method for providing an electro-optical switch, comprising:

providing a non-piezoelectric photonic crystal;

providing first and second waveguides in the photonic crystal adjacent to each other in a plane along a coupling length; and

changing a conductance in the plane along the coupling length to provide electro-optical switching between the first and second waveguides,

wherein said changing a conductance is accomplished by an electro-optic effect within the coupling length,

wherein said changing the conductance along the coupling length comprises optically inducing electron-hole pair generation.

40. (Previously presented) The method for providing an electro-optical switch of claim 22, wherein said changing the conductance along the coupling length comprises modulating a coupling coefficient between the first and second waveguides.

41. (Previously presented) The method for providing an electro-optical switch of claim 22, wherein said changing the conductance along the coupling length comprises changing an optical absorption coefficient along the coupling length.